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## PROCEDURES FOR IMPROVING FLIGHT COMBAT TRAINING DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 78 signed to press  
4 May 78 pp 1-3

[Article by Maj Gen Avn V. Ivanov: "Precise Rhythm to Summer Training"]

[Text] Fliers, just as all other fighting men of the Soviet Armed Forces, are in the middle of summer combat training. In the third year of the 10th Five-Year Plan -- a five-year plan of efficiency and quality -- the winged defenders of the homeland are striving persistently to achieve further mastery of the new equipment and weapons, their combat employment, and are improving their air and ground performance capabilities. In the classroom and on the field, in the air and on the ground the air warriors, utilizing each and every minute of training time with maximum effectiveness, are improving their knowledge, honing their flying skills, and are learning to hit the target with the first missile, bomb, and shell.

The winter training period produced gratifying results. Complex types of combat training were successfully mastered, and tasks pertaining to orientation of young flight personnel were accomplished. The majority of air units and subunits fulfilled and some overfulfilled their six-month combat and political training targets.

The results of the first period of training serve as a reliable basis for achieving the goals specified for the second. At the same time they showed where the weakest points in aviator training are to be found, what must be taken into consideration in the future, and where attention should be focused in order to prevent a decline in quality and efficiency of training and to finish the Armed Forces jubilee year with the highest possible performance results.

In the summer months there will be intensive combat flying, tactical flight exercises, and with autumn there will be an increase in the number of flights in adverse weather, at weather minimums, and it will be time to complete preparation for promotion to the next higher proficiency rating and to confirm rating. Accomplishment of the assigned tasks will demand extremely intensive effort in the work of air commanders, political agencies, staffs, party and Komsomol organizations, and all personnel.

The letter from the CPSU Central Committee, USSR Council of Ministers, All-Union Central Trade Union Council and Komsomol Central Committee on socialist competition for 1978 plan fulfillment and overfulfillment and a stepped-up campaign to increase production efficiency and work quality emphasizes that the main thing is to ensure a smooth working rhythm, as well as for each work force to meet its plan-specified targets and socialist pledges. It states further that to become actively involved in the nationwide campaign for efficiency and quality means to utilize all opportunities to achieve the highest possible labor productivity. Flight operations comprise the main content of the daily life and activities of aviation units. The more difficult the tasks assigned personnel, the more precise and organized ground preparation of aircrews and aircraft, control facilities and flight operations support should be. Consequently it is impossible to ensure smoothness and coordination in the operations of all flights without thoroughly-conceived, scientifically substantiated concrete plans specified for the entire training period, month, week, and day.

The advanced know-how of the finest military units indicates that high-quality conduct of ground preparations and consequently successful accomplishment of air missions are possible only if commanders, political workers, staff officers, party and Komsomol organizations work with an eye to the future and display persistence and efficiency, innovativeness and initiative. Precise work rhythm and accomplishment of the training program are grounded precisely in concrete, well-conceived planning. And the commander's role in this is particularly important. Accomplishment of missions with excellent quality, without accidents and near misses depends on how well he is able to direct the activities of his officers and how he organizes the planning of combat training.

This work is done in a businesslike and purposeful manner in the Red Guard Order of Lenin, Twice Red-Banner, Order of Kutuzov Guards Aviation Regiment imeni 50th Anniversary of the USSR, the personnel of which initiated socialist competition in the Armed Forces under the slogan: "Reliably defend the socialist homeland, be continuously combat ready, persistently master weapons and equipment, improve combat skills." At this unit's headquarters they scientifically analyze the concrete conditions in which combat training takes place; in flight training they effectively utilize the principle of sequence -- from the simple to the complex.

It is characteristic that planning here proceeds upward. Upon receiving a task, subunit commanders concretize it taking into account the level of preparation of the pilots and the specific features of the situation. Plans for the aircraft pair, flight, and then the squadron are formed on the basis of the personal improvement plans for each individual pilot. Having these plans in hand, the commander and his chief of staff specify realistic targets for the regiment.

As is indicated by the experience of this unit, the calendar plan beneficially influences the smoothness of flight operations. Essentially this is an

annual plan revised on a month-by-month breakdown, taking into account weather conditions in the base area, as well as various measures, personnel leaves, etc. Since good weather is prevalent in the summer period, the schedule specifies working on complex piloting techniques, single and group air engagements, combat maneuvering, firing on the range, that is, all complex types of combat employment which the young pilots must master. Particular attention is focused on practice under the hood, so that the pilots do not lose their instrument flying skills.

Thoroughly thought-out scientific planning ensures concreteness of assigned tasks and takes into account the actual conditions under which they will be performed, making it possible to achieve the greatest efficiency of flight training, to improve its quality and effectiveness. With this kind of planning there is an increase in the responsibility of officer-leaders for full implementation of the combat and political training plan. The efforts of all pilots are focused on accomplishing the main task: continuously to improve air proficiency.

The plan is a mirror in which is clearly portrayed the level of methods training of commanders and staff officers, their organizational role, and their ability to foresee and evaluate different situation variants. Unquestionably these qualities do not come easy. They are the result of considerable work on a day-by-day basis to improve methods skills and staff abilities, a high-principled and self-critical approach to existing experience and know-how.

Commander complacency and a disinclination to go deeply into planning matters are fraught with serious consequences. In the recent past, for example, in the aviation unit under the command of officer A. Aver'yanov they had everything necessary for accomplishing the assigned tasks. The pilots fully met the target for total hours logged. But in certain types of combat training results proved below target. Instrument weather was not fully utilized for training the young pilots to fly in clouds and above cloud cover. Naturally this had an effect on their proficiency growth. In cloudless weather they did little flying under the IFR hood to maintain instrument flying skills.

An analysis indicated that the main reason for this situation was a lack of purposefulness on the part of command personnel, a scattering of manpower and resources in organizing flight operations, poor knowledge of the level of proficiency of the men, and inadequate verification of execution of decisions. After the higher command echelon intervened, the situation in the unit improved. Now, taking into consideration the lessons of the past, the pilots are confidently picking up pace in mastering the heights of professional skill.

Organization of flight operations, preparation for and conduct of operations is a complex and laborious process. All the numerous components of this process are closely interlinked and interrelated. Every air commander knows this fact well. In order to ensure precise smoothness in the performance of

aircrews it is necessary to consider a great many trivial items of all kinds and to provide for the slightest changes in the ground and air situation. In the final analysis the course and result of the day's flight operations depend on how well conceived is the flight operations schedule. The skill and experience of the commander are manifested and the foundations of quality and safety of forthcoming flight operations are laid down in planning.

The following experiment was performed at a gathering of squadron commanders. The officers were instructed to prepare a flight operations schedule for a specific shift with absolutely identical input data: on flight personnel, aircraft on the flight line, level of performance of air warriors, and availability of supply and support. What was the result?

A study of the schedules showed that there were as many different schedule variants as there were persons in the experiment. However, two aspects of approach to this task were clearly defined. The schedules of the experienced commanders, while showing minor differences, provided maximum efficiency of each flight with a full work loading on equipment, without departures from the requirements of regulations governing flight operations. But some young officer-leaders presented models in which, for example, intervals between departures were unwarrantedly reduced, practice areas were overloaded, and the job of the air traffic control team was made difficult. Consequently various complications were programmed into these schedules right at the outset. Incidentally, the productivity of the flight operations schedules also left something to be desired.

Practical experience confirms that schedule preparation should be preceded by innovative work on the part of squadron commanders and their deputies, the flight operations officer, and the regimental commander. When organizing flight operations the commander should first of all clearly determine what goal he is pursuing on that flight operations shift, and what are the ways of attaining it. Thus he should mentally model the entire forthcoming day of flight operations.

Staffs should offer considerable assistance in this area. They prepare all data for decisionmaking. Their rigorous and objective monitoring promotes prevention of violations of flight training methods and guarantees unconditional accomplishment of combat training targets and adherence to the documents which regulate flight activities. In addition the commanding officer, either personally or through his deputies, checks to ensure correspondence between the exercises scheduled for the flight operations shift and the level of training of each pilot and the preparedness of personnel, aircraft, air traffic control team, and control facilities.

Also very helpful is a periodic analysis of progress in meeting the weekly and monthly flight training plan and summary of results of performance of individual sections of the program. Particular attention is focused not



only on quantitative but also on qualitative indices, deficiencies are promptly revealed and ways to correct them specified. The art of planning and guidance consists in the ability of commanders to elucidate those concrete elements where, at the cost of minimum outlays, one can obtain maximum effect and approach accomplishment of many tasks from the standpoint of the end results.

It is unquestionably very important to plan flight operations well. But it is no less important to perform all scheduled flights with precision and to ensure reliable coordination of the personnel involved in them. An important role in this is played by the flight operations officer. He effectively monitors precise observance and execution of the operations schedule. Toward this end he has at his disposal modern technical devices which enable him to see and hear the airborne aircrews, continuously to monitor their actions and, if necessary, promptly to intervene in those which border on violations of flight operations regulations or the conditions of a specific assignment.

The flight operations officer has before him in concentrated form data on readying the equipment for returning to the air and on interference threatening the normal course of combat training activities and affecting quality of flight activities. Through prompt personal intervention or through others on the air traffic control team he averts potential complications in the air situation. Efficiency and flexibility are ensured by discipline, efficiency and a high level of proficiency on the part of the men.

Considerable reserve potential for increasing the efficiency of flying labor is contained in organization and conduct of specific-purpose training flights. Every commander knows that if an excessively large number of exercises of a diversified nature are scheduled for a flight operations shift, this creates additional difficulties in readying the aircraft, in task performance and air traffic control. Specific-mission training flights make it possible to concentrate the attention of command personnel and all pilots on that category of combat training which is the most important at a given moment, to model accomplishment of this mission in an intelligent and well-conceived manner, and to organize socialist competition on exercises and their performance standards.

The return on each minute in the air is also increased as a result of combining tasks, of course assuming rigorous consideration of the performance capabilities of the pilots involved and the complexity of the exercises being performed. If a task in a specific category is being performed for the first time, there of course should be no combination of missions. But if exercises have already been worked on in the past and the pilot is working on improvement in their performance, combining brings inestimable benefit.

Many factors affect mission performance. The foundations of success are laid during classes in theory, simulator exercises, preliminary and preflight preparation. And if each of the stages preceding mission

departure has been fruitful for the pilot, one can be confident that efficiency and quality will be high. In other words, a pilot's preparation for carrying out an assigned mission depends in large measure on how much work he has done on it while on the ground and to what extent he has thought through his sequence of actions in different air and weather situation variants.

There is one more factor which affects mission effectiveness. It is the conscientiousness of the pilots and their objectivity in assessing their own preparedness to perform a given exercise. An airplane is a crew-served weapon. Obviously with the further evolution of aircraft this feature will acquire even greater importance. Consequently every specialist taking part in organization and conduct of flight operations, regardless of the post he occupies, should work at full effort, with the highest feeling of personal responsibility for the assigned sector.

Training and indoctrination of air warriors indicate that the effectiveness of flying labor increases when commanders train flight personnel not in a formal manner but innovatively, on a scientific basis, taking into account the demands of today and the nature of the missions which are to be performed in the immediate future, when combat training schedules are elaborated in advance and promptly revised in conformity with the changing situation. An important condition for this growth is vigorous and purposeful work by party and Komsomol organizations -- a reliable support of the commander, particularly in solving new and complicated problems. All-out development of competition mobilizes aviators and evokes in them a strong desire to achieve optimal results.

Campaigning for efficiency of military labor and for high quality of flying proficiency of air warriors and preflight preparation of aircraft, as well as precise organization and support of the flight operations day, one must bear in mind the party demand: today work better than yesterday, and tomorrow better than today. This presupposes constant dissatisfaction with what has been achieved, a critical attitude toward accomplished work, the search for new, unutilized reserve potential, a party approach to evaluating level of proficiency, and persistence in improving flying skill, flight operations safety and combat readiness. Each flight operations shift should become a fine school not only for personnel mastering their equipment and weapons but also for commander-leaders. They must objectively analyze errors and successes in order without fail to take everything into account in the future.

The airmen pledged to make the year of the 60th anniversary of the Armed Forces a year of further improvement in combat readiness, improvement in quality of combat proficiency, and persistent mastery of new equipment and weapons. In their daily military labor they are forging out combat skill and are receiving moral-political and psychological toughening. Pilots and navigators, engineers and technicians, as well as junior aviation specialists are learning that which is essential in war and are improving the efficiency and quality of combat training in order to be able to rise up in defense of the sacred borders of the homeland at any time, whenever it is necessary.

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## PSYCHOLOGICAL FACTOR IN HELICOPTER FLIGHT TRAINING DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 78 signed to press  
4 May 78 p 28

[Article by Lt Col V. Kurochkin: "Helicopter Dual Instruction"]

[Text] Pilot-instructor Sr Lt A. Chernov, having recommended a student pilot for a check ride prior to first solo, was sure that his boy would be okayed to solo. The flight leader agreed, but the testing officer, checking the cadet's piloting technique, decided otherwise. He stated that the cadet was inadequately prepared and recommended additional dual time. After the additional dual time, the pilot-instructor reported: "The solo candidate flies just as he did before, but he feels much more confident in the air."

What was the problem? The student pilot was not psychologically ready to go up with the superior officer, but the instructor had failed promptly to note this fact and to help his subordinate.

Most pilot-instructors are aware that it is not enough to teach a person how to fly; it is necessary in addition to instill in him faith in his ability, in the reliability of his equipment, and in a safely-completed flight. This means that the instructor should devote considerable attention to the moral-political and psychological training of his student pilot. He can unify the group as early as the theoretical training period, become for the student pilots an older friend and mentor and convince them that they should fly without infractions of safety regulations and without creating a pre-accident situation. Psychological training must be conducted long before the students go into the air.

The authors of studies on psychology of flying note that the importance of moral-political and psychological training of personnel is increasing day by day, for a cadet's flying psychology begins to develop when he is still in preflight school. And the flying future of the pilot cadets is determined by how correctly instructors approach the forming of personality and basic skills.

The psychological preparedness of a student pilot for his pre-solo check flight is also determined by his ability to fly with confidence with any superior on board, without any strain or tension. To achieve this our instructors, in the process of the dual-instruction program, offer the opportunity for student pilots to fly with higher-echelon commanders. At first some pilot-instructors considered such flights unnecessary. Experience demonstrated, however, that this was not so. The student pilot becomes accustomed to the presence of a higher-echelon commander in the helicopter, and he does not become tense.

Quite recently first-year cadets were training on a medium helicopter on the pilot-navigator program without solo flying. Even after 20-25 hours in the air some of the cadets were still rough around the edges. It seems that the reason for this was that the instructors worked little with the cadets at this stage, knowing that they would not be soloing during their first year and that a different instructor would be training them in their second year.

Now first-year cadets train on the same kind of helicopter with the second program. This program specifies a certain number of solo hours to be logged. And of course attitude toward flying technique changed abruptly both in the instructors and the student pilots.

During flight to a field landing facility the subunit's pilots and navigator teach the cadets in the cargo section the skill of visual orientation. Last year they did not do this very enthusiastically, figuring that the future pilot-navigators had plenty of cross-country flying ahead of them and that they would be able to learn everything they needed. But experience showed that as a result of the fact that more attention began to be devoted to piloting technique, and considerably less time was logged out of the pilot's seat. The average number of hours logged out of the pilot's seat in a light helicopter was below the standard figure, and in the second year of training, when moving to a medium helicopter, fewer hours are expended per student pilot. As a result the cadet receives the same amount of dual time, but in two year's time.

Naturally training on a medium helicopter is more extensive than on a light helicopter. There still occur cases, however, where cadets wash out of the second year due to inability to make the grade in the air. But their capabilities could be determined during the first year, while training on a light helicopter.

One of the difficulties of training on a medium helicopter is that it is "heavy." The majority of pilot-instructors have the student pilot get a feel of the aircraft's response and handling in initial training, putting the aircraft into abnormal situations and attitudes beyond acceptable operating standards. This may include vigorous movement of the controls. A light helicopter is forgiving, but a medium helicopter is not always. The training process on a medium helicopter is longer, so that the pilot-instructor permits the student pilot to fly the aircraft within narrower operational limits, and this leads to constraint.

The autopilot, the pilot's friend, during training of student pilots becomes practically their enemy, since with an autopilot it is impossible quickly to determine individual errors in piloting technique (instruction and training flights are flown with the autopilot engaged, other than certain dual-instruction and check flights, during which the autopilot is disengaged). The large number of instruments and automatic control devices also increases strain on the trainee and applies mental pressure. And yet one should learn proceeding from the simple to the complex.

Of course there are also positive aspects to teaching helicopter flying in a medium helicopter at the very outset. For example, it eliminates the possibility of transferring negative habits and errors from a light to a medium helicopter. A dynamic control pattern is formed and perfected on a helicopter of a single type. But for acquisition of confident piloting technique and in the interests of air safety, we still feel that initial training should be on a light helicopter, for on this type of helicopter the student pilot develops the quickness of response which is needed for flying a medium helicopter.

Not all student pilots acquire the needed skills immediately in flight training. Commanders must endeavor not to overlook anything on flights when the students act as pilot in command, for it is precisely following the first successful training flights that as a rule deviations begin, and young pilots develop excessive self-confidence unfortified by solid flying technique. It is the instructor's job promptly to explain the perniciousness of this phenomenon and to teach them to fly with warranted confidence.

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## METHODS OF IMPROVING PSYCHOLOGICAL TRAINING OF PILOTS DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 78 signed to press  
4 May 78 p 29

[Article by Lt Col A. Belov: "Evaluating Readiness"]

[Text] Flight leader Capt A. Golenkov flew out to the training area with one of the instructors for advanced flying techniques. Things were proceeding precisely by the book. The flight leader was clearly pleased: the young instructor was flying vigorously and cleanly. But then during recovery from a dive the airspeed indicator needle climbed into the red. The pilot had clearly been late in initiating recovery. The flight leader took over the controls. He succeeded in bringing the buffeting, heavily G-loaded aircraft back to horizontal flight.

As Captain Golenkov determined later on the ground, incorrect operation of the controls in the given situation was a consequence of insufficient psychological preparedness on the part of the young instructor for this flight, for this instructor's professional skills were sufficiently high, as the flight leader correctly believed.

Pilot psychological firmness is developed not in one day or one month. It is formed in the course of all his flying service, and in the process of preparing for a forthcoming mission, readiness to accomplish the specific scheduled task is honed to a sharp edge. How can one prepare a pilot psychologically for a mission in a strictly limited amount of time? It is difficult to answer this question unequivocally, but several recommendations can be given. This work needs a vigorous, innovative approach, since it is connected with human psychology. It is determined in large measure by the mission, its complexity, degree of newness, significance, pilot's (student pilot's) level of proficiency, his individual features and character traits.

On what should one focus a pilot's attention during preparation prior to the mission? First of all, on elucidating the content and sequence of performing the mission; second, on knowledge of the conditions under which the mission will take place, that is, the pilot should study the air, ground, tactical and weather situation, without which it is impossible to gain a graphic picture of the mission, a model; third, on working on performance in difficult situations on the simulator.

Thus while still on the ground the pilot must get an idea of the specific features of psychophysiological perception, the sensations of various moments, situations and conditions in the air. Precise knowledge of the specifics of the mission gives the instructor a basis on which to assume that the pilot is psychologically ready for the mission.

Flight instructor personnel in most cases proceed precisely in this manner. But not all succeed in achieving the desired result. Young pilot-instructor Lt V. Balabanov was briefing his student pilots on flying in the pattern. The officer precisely described the task. Although everything was done correctly, the briefing was monotonous, and the student pilots clearly were not aware of the importance of the imparted information for successfully accomplishing the mission. The result was that when verifying readiness flight leader Maj V. D'yachenko saw that student pilots Shein, Boyko and others were insufficiently prepared for the task, both professionally and psychologically. Their actions and answers lacked confidence.

Quantitative and qualitative information occupies an important place in general preflight briefing and preparation, including psychological. An insufficiency of information reduces preparedness and evokes feelings of lack of confidence and doubts. Abundant information places a pilot who is unable to select the main points into conditions close to his maximum psychological capabilities. Therefore prior to preflight briefing one should select only those topics and items knowledge of which is unquestionably essential for proper preparation for the mission.

On the basis of knowledge of the elements of the mission, studied on the ground, and information obtained from various sources, in the air the pilot creates an information model, a visual picture of where and in what configuration the aircraft is positioned, whether the actual conditions correspond to the desired, whether the equipment is operating properly, what must be corrected and when. In addition, an information model makes it possible promptly to spot the development of complications and makes it possible to obtain precise orientation during the mission.

An information model alone is inadequate for making a decision. Only an aggregate of knowledge and experience, a volume of information on the situation obtained in advance enables the pilot rapidly to formulate a conceptual model which influences concrete actions. Thus the pilot's psychological preparedness for action is the continuous presence of a conceptual model.

Experienced instructors teach the student pilots to construct such a model on the ground, during preflight briefing and preparation. They carefully break down every flight training mission and work with the trainees on their procedures in simulators. Practical experience has shown that if sufficient attention is devoted to psychological preparation, higher proficiency is achieved.

There are two ways to determine the degree of a pilot's psychological readiness for a mission: objective and subjective. Important indicators of his preparedness for a mission are productivity of activities and psychophysiological cost of the achieved result.

The following objective method is employed at the school to evaluate these indicators. Type TL and KTS flight simulators are hooked up to a Fiziolog-3 unit, which in the process of training drill records the student pilot's pulse, respiration rate, and tension. In addition to these records, in assessing and analyzing a flight the instructor of course takes into account how speed, altitude, course and other parameters are maintained. A conclusion is reached on the pilot's psychophysiological readiness for an actual training flight on the basis of the data recorded by the Fiziolog-3 and standard performance evaluation requirements.

Simulator facilities, however, are not always close to airfields, and organization of testing involves certain difficulties. Therefore the second, subjective method is employed. The pilot-instructor or commander (and the student pilot himself) can determine psychological readiness by utilizing a number of psychophysical indicators.

If a pilot is psychologically ready to fly, he is in a good mood and feels excellent. He wants to get into the air as soon as possible and feels a physical need to stand up to stress in flight. His thinking process becomes activated, he forms a clear picture of the forthcoming flight and of every action. He is convinced that this flight will be performed better than the preceding one. He performs with precision and ease in the simulator or aircraft cockpit.

If the pilot is not psychologically ready to fly, he displays reduced activity and his mood declines. He has an indifferent attitude toward flying: "If they say fly, I'll fly, if they say no, then no it is." He does not recall yesterday's flight. No comparison -- I shall fly better or worse -- is made. No picture of the flight arises when going through his actions in the aircraft cockpit or simulator. His attention involuntarily shifts from one object to another or holds on to some one object and moves away from the flight. Although he performs all actions correctly, he feels that there is something missing in his performance. The pilot is irritable, readily takes offense, entertains unperceived, unclear doubts, is unsure of himself, although he has fully completed all preparations and training and his state of health is excellent.

The subjective and objective methods will help prepare student pilots and pilots for a mission in a purposeful manner. Under present-day conditions these methods, together with excellent knowledge and rigorous observance of the demands of the requirements governing flight operations, will substantially increase air safety. Moral-psychological preparation is an important component of accident-free flying. Wherever constant attention is devoted to this matter, the tasks of combat and political training are more successfully accomplished.

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## RELATION BETWEEN WAR AND ECONOMICS DISCUSSED

Moscow VOYENNO-ISTORICHESKIY ZHURNAL in Russian No 6, signed to press 30 May 78, pp 3-10

[Article by Col Yu. Vlas'yevich, professor, doctor of economic sciences: "War and Economics. 'The Economic Costs of War' as a Military-Historical Category"; passages enclosed in slantlines printed in boldface]

[Text] A study of the interconnection between war and economics is one of the important tasks of the science of military history. An analysis of the individual, particular ties between war and economics is extremely valuable and necessary. Just as important is the study of generalizing categories which reflect **large-scale military-economic** problems.

One of the most essential categories which are used for a general national-economic characterization of wars is their economic costs. Their determination and comparison in wars and armed conflicts, when taken in historical sequence, provide valuable material for learning the regular laws and trends in the economics of war, help in the more complete consideration of the economic conditions of armed conflict, and present more precisely the volume of material resources which it absorbs and the economic consequences to which it leads.

It should be kept in mind that the economic costs of wars are not simply a statistical quantity which sums up the financial result of one or another page of military history. This category is profoundly social, reflecting a variety of economic processes which arise in connection with the preparation and waging of wars as well as in overcoming their consequences. In essence, these processes touch upon all the material and social aspects of society's life.

It is well known that the **total** sum of the economic costs of war includes the direct and indirect expenditures on it. The former consists of/ the sum of material resources expended on military production, the equipping of the armed forces, the operational improvement of the TVD [theater of military operations], the creation of strategic material reserves, and the organization of civil defense and the military training of the population. It also includes

the amount of material damage caused by combat operations: the destruction of industrial objects, means of transportation, housing, administrative buildings, cultural and domestic-services facilities, losses of citizens' personal property, and so forth.

/The indirect costs/ of war are not connected directly with the armed conflict, but they stand out as its consequence. These include the payment of pensions to former servicemen and their families as well as the interest on state war-time loans. Furthermore, they include the losses caused by the conditions in which the economies of the warring sides function. The fact is that war not only absorbs the material resources which have been created and not only destroys but also hinders their creation and leads to the breakdown of the production structure which has evolved and to the curtailment of the activity of a number of branches which do not receive sufficient resources. In the course of armed conflict, accumulation on a scale of the entire national economy is inevitably curtailed and sometimes stops altogether while the technical level and capabilities of many branches of production are lowered since timely repair is not performed and equipment is not renewed. Agriculture is deprived of a considerable portion of its machinery and the livestock, of fertilizer. The operation of transportation is disrupted and many enterprises in the frontline zone stand idle. The economy suffers due to a reduction in the size of the work force engaged in production, a reduction in the level of professional training of people, expenditures on training personnel in the national economy to replace those called up to the armed forces, and a reduction in the natural population growth.

In many respects, costs of this type do not have a lesser effect on the economy but may even have a greater effect than direct costs. Their influence is manifested in the course of the war as well as after its conclusion.

The portion of direct economic expenditures which are covered through the outlays of the warring countries' state budgets comprise the budgetary costs of the war.

/The trend toward an increase in economic expenditures has appeared in past wars/. Thus, considering only budgetary expenditures the Seven Year's War (1756-1763) cost 350 million dollars, the Napoleonic Wars (1792-1815)--almost 6 billion dollars, the Crimean War (1853-1856)--350 million dollars, and the Boer War (1899-1903)--1.5 billion dollars.<sup>1</sup> In the Russo-Japanese War, Russia alone expended 2.6 billion rubles (1.3 billion dollars) in direct expenditures and all losses of the national economy were determined as at least 4-5 billion gold rubles.<sup>2</sup>

The economic costs increased especially sharply with an increase in wars to world scales. Budgetary costs (in current prices) for World War I were determined at 208 billion dollars (145 billion dollars for the countries of the Entente and 63 billion dollars for Germany and her allies).<sup>3</sup> According to UN data, military outlays for World War II were 1 trillion 117 billion dollars (including 695 billion dollars expended by the states of the anti-Hitler coalition and 422 billion by Germany and her allies).<sup>4</sup> The gold content of

the dollar during the years of World War I was 1.5 grams, and during World War II, 0.889 grams. With consideration of the devaluation of the dollar, the budgetary costs of World War II were 3.5 times greater than World War I.<sup>5</sup>

Under contemporary conditions, local wars are also requiring ever greater economic expenditures. For example, the budgetary costs of American aggression in Korea (1950-1953) were 54 billion dollars for the United States<sup>6</sup> while it expended about 150 billion on the war in Vietnam.<sup>7</sup>

During the war in the Middle East in October 1973, Israel alone during the 18 days of military operations expended 7 billion dollars in material values<sup>8</sup>, that is, almost 400 million dollars per day. We recall that budgetary outlays for one day of World War II were 500 million dollars. Consequently, the expenditures of one country in contemporary local war proved to be close to the expenditures of the 61 states which took part in the last world war.

Capitalism caused the tremendous increase in expenditures on maintaining armies and on wars. "The army," noted F. Engels, "has become the main goal of the state, it has become an end in itself; the people exist only to supply and feed the soldiers. Militarism predominates over Europe and is devouring it."<sup>9</sup> Imperialism has plunged the peoples into a world war twice. This led to a gigantic expansion in the theaters of military operations and placed a large portion of the entire world economy at the service of their economic support.

The growth in the material outlays for wars is caused to a considerable degree by the interests of the monopolies which are extracting huge profits from the arms race. "Is war a terrible thing?" wrote V. I. Lenin. "Yes, but it is a terribly /profitable/[in italics] thing."<sup>10</sup> The imperialist bourgeoisie, in particular the leaders of the military-industrial monopolies, are interested in a growth in military expenditures, a considerable part of which is converted into profits for the suppliers of weapons. For example, after deducting taxes (in 1967 prices), the mean annual level of profits of US corporations was: during World War II--19.7 billion dollars, for the years of the Korean War--24.9 billion dollars, and in the period of aggression in Vietnam--44 billion dollars.<sup>11</sup>

The increase in the economic costs of wars also depends on technical factors. In the biggest capitalist countries during World War II (in comparison with World War I), the production of airplanes increased almost four-fold, of artillery weapons--more than five-fold, and of tanks, more than 15-fold.<sup>12</sup> The further development of the scientific and production base of the biggest states created conditions for the continuous reequipping of the armed forces with more improved weapons, combat equipment, outfits, and engineering and other materiel.

An increase in the quantity of new types of weapons and combat equipment became proper with the expansion in the scope and variety of the missions to be accomplished by the armed forces. This complicated even more the problem of the material and technical outfitting of armies. Both production and the employment of military equipment required ever greater material expenditures.

The participants in World War II expended 800 million tons of steel<sup>13</sup> on its preparation and waging. In World War I, the warring countries expended 10-12 percent of the total amount of liquid fuel consumed for military purposes, and in World War II--from one quarter to one half.

/The structure of the material resources used for military purposes has also changed in the wars of the 20th century/. In contrast to the past, when the basic item of military consumption was the maintenance of the personnel of the army and navy, in wars of this century technical means have become the decisive part of military consumption. Even in World War I, the same amount of resources was expended on their purchase as on the maintenance of the personnel; in World War II, 75 percent of the outlays went for the acquisition of technical equipment and only 25 percent for maintenance of the personnel.

Qualitative changes in the means of armed conflict are having a great influence on the dynamics of the economic costs of wars. As a rule, the new types of weapons are more complex and, therefore, are more expensive. This is explained by the fact that the requirements for weapons combat capabilities are increasing more rapidly than the productivity of labor in military industry. As a result, the cost, and consequently, the price of each unit of combat equipment has a tendency to increase. The increase in the cost of military production in the capitalist countries is also furthered by a policy which is directed toward an excess in prices over the cost of military commodities.

The wars of the 20th century led to an increase in material destruction as a result of the deepening of contradictions being resolved by force of arms, an increase in the spatial scale of armed conflict, and an increase in the power of the destructive means possessed by the warring sides. The incentives to inflict damage on the enemy by destroying material values changed substantially. Under conditions of the increased dependence of the course and outcome of war on the economy, putting his installations out of operation acquired strategic implications.

/Inflicting economic loss on the enemy has become one of the basic missions of military operations/. According to data in the report of the Soviet delegation at the Genoa Conference, the total sum of the losses caused our country by the military intervention and the Civil War was 39 billion prewar gold rubles, which was approximately equal to one fourth of Russia's national wealth.

World War II had a more destructive nature; in it, the material losses inflicted on the Soviet Union were especially severe. It lost about 30 percent of its national wealth. In the USSR, losses from destruction connected with combat operations and the occupation were 679 billion rubles (at the then existing scale of prices), or 128 billion dollars. In other countries, the dollar losses were 48 billion in Germany, 21.5 billion in France, 20 billion in Poland, and 6.8 billion in Great Britain.<sup>14</sup>

The structure of direct economic costs also changed substantially in this war. This is shown by the following comparative data.

## Structure of Direct Economic Costs of World Wars<sup>15</sup>

Costs to the Economy	War of 1914-1918		War of 1939-1945	
	in billions of dollars	in percent of total	in billions of dollars	in percent of total
Direct	235.8	100	1433.3	100
Budgetary	208	86.7	1117	71.7
Material destruction	27.8	13.3	316.3	28.3

It is evident from the table that the material destruction in World War II increased both in absolute terms and in the proportion of total volume of direct military expenditures.

Military history also indicates that indirect costs also increase. A considerable part of them is the result of the diversion of tremendous human resources and the means of production from their productive use. World Wars I and II diverted tens of millions of people from productive activity. A considerable number of enterprises in the countries which fought were shifted to the output of war production. In connection with this, the volume of products for peaceful purposes was reduced and human society was deprived of a considerable quantity of material wealth.

Consideration should also be given to the circumstance that in a number of countries that fought the volume of accumulations was less than the depletion of productive capital, that is, fixed capital was consumed. In the majority of states the total volume of production during the war years decreased, as a result of which national income decreased and, along with it, national wealth.

An analysis of the damage which the economy suffers under the conditions of large wars shows that indirect losses cannot be disregarded since they comprise a significant portion of the material sacrifices which the warring countries bear. Even an approximate accounting of the indirect costs of war tells us much.

Attempts to estimate the indirect costs of the war of 1914-1918 were made by the American economist, E. Bogart. According to his calculations, they comprised 152 billion dollars,<sup>16</sup> that is, approximately two thirds of the direct costs of that war.

The total economic costs of the Soviet Union in the Great Patriotic War were 2,569 billion rubles (in 1941 prices). This sum includes direct expenditures for military purposes (550 billion rubles) and losses from the enemy's destruction and pillage of public and personal property (679 billion rubles). The remaining sum (1,340 billion rubles)--more than half of all material

expenditures--is the share of indirect costs, that is, losses of income which are suffered by state enterprises, cooperatives, kolkhozes, and the population.<sup>17</sup>

The increase in the significance of indirect losses is also shown by the general data on the costs of World War II. According to approximate calculations, its losses to the economy reached 4 trillion dollars.<sup>18</sup> No more than 1.5 trillion dollars were the share of military expenditures of the budget directly and direct material destruction. Indirect costs make up all the rest.

/A special question is the tie between economic costs and human losses/. Human life cannot be compared with any material values, and in this sense human losses are an absolutely independent element of military costs. But at the same time, without consideration of human losses we cannot obtain a correct impression of the economic expenditures for wars. The lives of people, their health and ability to work are not only a priceless gift of nature and the result of social conditions, but also a mighty economic force.

The loss of 50-55 million people in both world wars is a tremendous loss to the economy.<sup>19</sup> As a result of human losses, society was deprived of a considerable number of workers who, if there had been no war, could create material values by participating in productive labor. Losses in ability to work as a result of wounds is also a significant loss of society's economic resources.

The regular law in the growth of military-economic costs is displayed /not only under the conditions of war, but also in peacetime/. This is explained by the aggressive policy of the imperialist states, the intensive arms race being waged by these countries, and by the steady growth in their military expenditures. Thus, from 1949 through 1977 the military expenditures of the NATO bloc increased nine-fold, from 18.7 to 165 billion dollars.

During these years, the total amount of military expenditures by the countries of the North Atlantic bloc in current prices reached a tremendous value--2.4 trillion dollars.<sup>20</sup>

As formerly, the leader of the arms race and the inflation of military expenditures is the United States whose share is almost two thirds of all military expenditures of the North Atlantic bloc. According to the draft federal budget for fiscal year 1979 in the United States, expenditures for military purposes will increase by 9.4 percent and will exceed 128 billion dollars.

The chairman of the Communist Party of the United States, G. Hall, in his book, "Imperialism Today," points out that about 13 percent of the country's total labor force is involved in filling the Pentagon's orders.

China is striving to participate actively in the contemporary arms race. Her militaristic policy is also finding reflection in the military-economic sphere. In 1976, China's direct military expenditures comprised 41.5 percent of the state budget's appropriations--one of the highest indices in the world.

Through the fault of the imperialist governments who do not desire to bring about relaxation in international tension, the growth in military expenditures is continuing in the world. Their amount is doubling approximately every 15 years. In 1960, they comprised 130 billion dollars, in 1970--209 billion, and in 1977--350 billion dollars.<sup>21</sup>

/Illumination of the problem of military-economic costs is an arena of acute ideological struggle/. Its analysis from Marxist-Leninist positions presumes the most complete and objective consideration of all elements of the economic costs of wars. Marxism-Leninism requires the disclosure of the class reasons for the growth in military-expenditures, the demonstration of the closest ties between the social essence of wars and their costs, and the exposure of imperialism's policy which is directed toward an increase in monopoly profits through wars and the arms race.

The determination of the amount and structure of economic costs is one aspect of the problem. Another, no less important, aspect is a determination of the sources to defray them.

In regard to the capitalist countries, this means that it is necessary to show how the imperialist bourgeoisie are trying to lay the economic burden of wars on the workers and which methods and means are used for this (taxes, loans, inflation, and so forth). V. I. Lenin provided a model of a classical approach to this question. In the years of World War I, he mercilessly exposed the methods for using the military situation to intensify the exploitation of the workers and a growth in the profits of the weapons suppliers. V. I. Lenin wrote that "all the great powers are waging an imperialist, capitalist war, a plundering war, a war for the oppression of small and foreign peoples, a war in the interests of the profits of the capitalists who are beating the pure gold of their profits of billions out of the horrible sufferings of the masses, out of proletarian blood."<sup>22</sup>

Concerning the socialist countries, it is necessary to show the forced, valid nature of material expenditures on wars and the interest of socialist society in their possible reduction. Socialism supposes the fairest distribution of military-economic burdens among classes and social groups.

The Marxist method for estimating military-economic costs is resisted by bourgeois treatments of this category. However, the common threads in the views of the bourgeois theoreticians are: first, rejection of an analysis of the social factors which are causing the tremendous growth in the costs of wars in the 20th century and attempts to disprove the Marxist thesis of imperialism as the main culprit of wars and military-economic burdens; second, the absence of a clear definition of the concept "war costs" and the striving to limit themselves to the consideration of only several components in their quantitative determination (budgetary expenditures, material losses, and so forth), which inevitably leads to a distortion of the notion concerning the actual extent of the sacrifices which mankind is bearing; third, passing over in silence the class nature of the sources for defraying the costs of wars and the striving to replace the question of which classes pay for war with the question of ways to mobilize the resources to finance the war.

V. I. Lenin criticized those bourgeois demagogues who reduced the analysis of the most complex military-economic processes to a sum of banal phrases, in particular those of the German Professor R. Göniger [as transliterated] who glorified the growth in military expenditures and tried to prove their wholesomeness for the German nation. As regards this, V. I. Lenin wrote in 1913: "The chatter of the vulgar person devoted to militarism who argues that expenditures on the army are not losses at all because the money remains in the country, the tremendous profit from them...."<sup>23</sup>

A number of bourgeois theoreticians (G. Fisk and E. Bogart--the United States, J. M. Keynes and A. Pigou--Great Britain) tried to illuminate the problem of the economic costs of World War I from their class positions. Preconception and a distorted illumination of a number of key problems are typical of all their works. For example, the American financier G. Fisk wrote: "...we determine the cost of war as the excess of annual expenditures for each year of the war over the norm of prewar expenditures."<sup>24</sup> The error in this approach to the study of economic costs of war is the vagueness of the concept of "norm of prewar expenditures." It is obvious that here we should consider the absolute volume of military expenditures and not their excess above some arbitrary level.

The biased class nature is clearly displayed in the American statistics which consider the costs of World War II from the financial aspect alone. This is done to exaggerate the actual contribution of the United States to the attainment of victory over Hitlerite Germany and imperialist Japan. Operating with data about a high US military budget and comparing them with budgetary expenditures of various countries for the war, many American authors are trying to thrust on the readers the conclusion that it was namely the United States which made the decisive contribution to the cause of victory over the Hitlerite coalition and, in so doing, bore the most substantial economic costs.

In order to exaggerate the role of their country in World War II, many publications issued in the United States overstate the volume of the United States military expenditures. In the "World Almanac and Book of Facts," US budgetary expenditures on World War II are determined by the figure of 330 billion dollars.<sup>25</sup> This does not correspond to reality, first of all because all expenditures of the country's federal budget for the 1941/42-1944/45 fiscal years comprised 306.7 billion dollars.<sup>26</sup> According to official statistics, direct US military expenditures for these years were 224 billion dollars.<sup>27</sup> The sources for the formation of these funds were taxes collected primarily from the workers, internal loans, inflation, and robbery of colonies and countries dependent on the United States.

A number of West German military historians and economists (F. Federau, W. Goerlitz, and others) are trying to distort the true view of the sources to defray the military-economic costs of fascist Germany. The extent of a source such as the plundering of the occupied countries is clearly understated. In the majority of publications on this question, only direct financial plundering is considered, that is, the drawing on the financial resources of the occupied countries to defray the military expenditures of Hitler's



Reich. The defraying of military costs through the plundering of material valuables, the forced export of a labor force, the establishment of discriminatory rates of exchange, and many other forms of robbery of the occupied countries is not shown.

Use of the category "economic costs of war" has not only a historic-cognitive significance. Of course, it can be used to provide a better impression of the interrelation between war and economics in the past. But it is even more important to use this category for knowledge of the regular laws of contemporary war and for working out a scientifically substantiated military-economic policy.

The connections between war and economics under contemporary conditions are continuously strengthening and becoming more and more complex and ramified. The scales of providing the armed forces with material resources are continuously growing and the cost of the means for armed conflict and the role of economic support of war are increasing more and more.

A comprehensive consideration of the factors which determine the nature of contemporary war leads to the conclusion that the trend toward an increase in military-economic costs is continuing to operate. This trend has intensified considerably in many directions.

Under these conditions, it has become especially important to have a realistic impression of the scales and trends of economic costs which contributes to a successful struggle for increasing the effectiveness of utilization of the material resources which have been allocated for defense.

At the same time, there is an ever greater increase in the significance of the policy of the CPSU which is directed toward reducing international tension, bringing about its relaxation, and toward restraining militaristic forces and ensuring a firm peace on earth.

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## POSTWAR DEVELOPMENT OF ANTITANK DEFENSE DISCUSSED

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[Article by Col V. Kiselev, docent, candidate of military sciences: "The Development of the Antitank Defense in the Postwar Years"]

[Text] After the war, the methods for the organization and conduct of the antitank defense received further development which can be divided into two stages.

The first stage began with the end of the war and continued until the middle of the 1950's. During this period, the rifle subunits were equipped with new, more powerful antitank weapons: hand-held and mounted grenade launchers and recoilless guns which can pierce armor with a thickness of 150 mm or more.<sup>1</sup> At the same time tank-destroyer artillery, self-propelled artillery mounts, and tanks were improved. Antitank guns became self-propelled, facilitating their maneuver on the battlefield. Other special antitank weapons were also improved: hand grenades, engineer mines, aerial bombs, and so forth. All this increased the capabilities in combating enemy tanks.

It was considered that an enemy attacking tank force would have an average of 50-60 tanks per kilometer of front, of them 15-20 in the first echelon. In order to stop it, it was necessary to put up to 40-50 percent of the tanks out of action. Proceeding from this, it is necessary to have an average of 8-10 antitank guns on each kilometer of a rifle battalion's defensive front, and, in the main defensive zone, up to 25-30. With the skillful organization of the fire system and maneuver, such densities should have ensured the destruction of 25-30 tanks per kilometer of defense and the defeat of the enemy's attack.<sup>2</sup>

In the indicated period, the PTO [antitank defense] system included company antitank strong points (RPTOP) which were combined into battalion antitank defense centers (BPTU); antitank areas established on tank avenues of approach in the defense's entire tactical depth; artillery, tanks, and self-propelled artillery mounts (SAU) located on tank avenues of approach; antitank obstacles which cover these avenues, artillery firing positions, tank and

SAU positions; artillery antitank reserves (APTR), tank reserves, and mobile obstacle-placing detachments (POZ).

Tanks were engaged by all combat arms and special troops. Here, the primary role was played by direct artillery, SAU, and tank fire in front of the FEBA [forward edge of the battle area] and in its depth; antitank obstacles and natural barriers and fire cover of artillery, tank, and rifle subunits and units; and the prepared maneuver of artillery-antitank and tank reserves and mobile obstacle-placing detachments. The antitank defense was organized on the entire tactical depth with the use of a large part of the weapons to engage enemy tanks in front of the FEBA and within the limits of the main defensive zone.

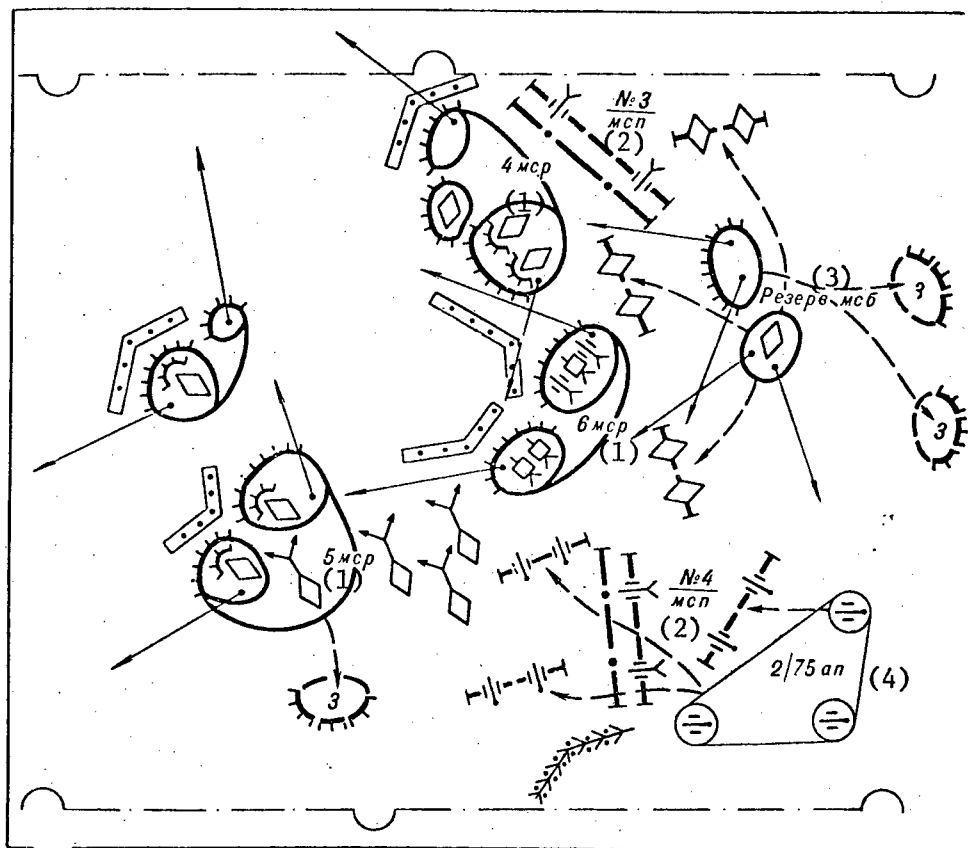


Fig. 1.

Key:

- |                             |   |
|-----------------------------|---|
| 1. Motorized rifle company  | 3. Reserve of motorized rifle battalion |
| 2. Motorized rifle regiment | 4. 2/75 Artillery Regiment              |

The RPTOP was the basis of the company defense area. As a rule, on important tank avenues of approach and with the availability of a sufficient quantity of weapons the antitank strong point coincided with the boundaries of the rifle company defense area. On the main direction which was accessible for the

operation of enemy tanks, the company could be reinforced by 8-15 mounted grenade launchers, antitank guns, SAU's, and tanks and it also received up to a platoon of flame throwers.

The BPTU combined the antitank strong points of the battalion's rifle companies and the weapons for combating tanks which are directly subordinate to the rifle battalion commander (Fig. 1). The fire system of the BPTU ensured the survivability of the antitank weapons through their mutual fire support and coordination between RPTOP's, the efficient exploitation of terrain conditions and the fire capabilities of the antitank weapons, and the participation of their major portion in destroying enemy tanks in front of the FEBA, the conduct of flanking and oblique fire, destruction of tanks which have penetrated the defense, the maneuver of fire frontally and into the depth, and the all-around defense of each RPTOP individually and the BPTU as a whole. When it was difficult to establish fire coordination between antitank strong points and the centers of adjacent subunits (for example, with the presence of covered approaches which could not be taken under fire), ambushes were established, as a rule from the weapons directly subordinate to the battalion commander.

Tanks which had broken through the battalion defense were to be destroyed by the weapons of the senior commanders which were located in antitank areas and the reserve and by mines emplaced by the mobile obstacle-placing detachments.

The antitank area was an element of the combat formation of the defending unit and large unit. It usually included up to a tank-destroyer artillery regiment and one or two tank platoons (or one or two SAU batteries) reinforced with flame throwers and combat engineers. Control of all weapons was executed by the commander of the antitank area. An antitank area of this composition permitted him to have up to 12-15 guns per kilometer of front which ensured the repelling of an attack by 30-35 tanks. Being located behind the defensive positions of the rifle subunits and units (usually behind the first echelon), the antitank area was to accomplish the independent combat mission of holding a terrain area. A system of fire was created in it, an all-around defense was prepared, and firing positions were improved to include one or two alternate positions outside the antitank area.<sup>4</sup> The area's fire system provided fire coordination with adjacent antitank areas, battalion centers, artillery located on indirect fire positions, and with antiaircraft batteries. In order not to give it away prematurely, small groups of enemy tanks were destroyed by a specially allocated portion of the guns. The repelling of a massed tank attack began with group fire at maximum ranges.

The artillery-antitank reserve was established by the senior commanders for the accomplishment of missions which arise in the course of battle and to intensify the efforts of the rifle battalions and weapons of the antitank areas.

In combating tanks, a large role belonged to aviation and the artillery firing from indirect fire positions. They were to initiate the engagement at the

distant approaches to the defense. By the attack of bombers and attack aircraft and the fire of long-range artillery, the defending side tried to destroy the enemy tanks even prior to their approach to the FEBA, disorganizing their columns and holding up the advance. The aviation and artillery intensified their strikes against enemy tanks in the attack position, trying to defeat the attack by a counterpreparation. With the start of the attack, by means of standing and rolling barrages the artillery disorganized the tank combat formations and destroyed them.

A role of no small importance in the antitank defense was allotted to obstacles, and first of all minefields, which were emplaced in the period of preparation of the defense as well as in the course of battle on the paths of the tanks which have broken through. After the war, as a result of the motorization of engineer units the maneuverability of mobile obstacle-placing detachments was increased and the supply of mines was increased considerably in comparison with the war. However, until the middle of the 1950's mining was accomplished primarily manually.

As early as the first postwar years, the number of tanks which were part of the counterattacking units and large units increased. Therefore, the role of counterattacks in combating enemy tanks increased. In this regard, the counterattack by the forces of the mechanized division had special significance.

Thus, in the first postwar stage of development the antitank defense was organized and improved on the basis of the generalized experience of the Great Patriotic War with consideration of the qualitative changes in antitank weapons and the increased capabilities of troops in destroying enemy tanks. The improvement of the antitank defense in this period consisted of an increase in the stability of its elements which are organically a part of the overall defensive structure of combined-arms subunits, units, and large units (RPTOP, BPTU, and antitank areas) and an increase in the maneuverability of mobile elements of the PTO which intensify their efforts in the course of battle (APTR, POZ). The main role in the antitank defense was played by special antitank weapons and general-purpose weapons which were brought in to engage tanks--aviation and artillery. On the whole, the increase in the amount of armored equipment in the armies of the probable enemy led to an increase in the role of the antitank defense--the basis of the defense, and its organization was the most important duty of commanders at all echelons.<sup>6</sup> However, prior to the end of the 1950's, as formerly PTO was considered a type of troop combat support which, to a certain degree, minimized its significance.

The second stage in the development of the antitank defense coincided with changes (1954) in the weapons and methods for armed conflict. As nuclear weapons increased in quantity, they became the main means to defeat the enemy and their employment increased the role of tanks in contemporary battle. Possessing the least vulnerability to a nuclear burst, powerful armament, and high mobility, the tank troops are capable of the most effective exploitation of the results of nuclear strikes and of conducting an attack at high speeds,

to a great depth, under conditions of destruction, and on terrain with a high radiation level which hinders and even excludes the employment of other combat arms. Therefore, the proportion of tank troops has increased considerably in the armies of the probable enemy.

The protection of the infantry which is equipped with armored vehicles, and of the other combat arms and special troops (for example, the artillery and engineer units) has increased. Armored vehicles have become a mass means for movement on the battlefield. The success of combat operations in the defense depends on their destruction to a great extent. All this caused the swift development of special antitank weapons.

The combined-arms subunits and units have been armed with a fundamentally new weapon for combating tanks--the antitank guided missiles (PTURS) which possess great firing accuracy, great armor penetrability, increased range, and effectiveness of fire. At the same time tank armament, antitank cannons, and hand-held and mounted grenade launchers and other weapons which were available in the first postwar period were improved. Their armor penetrability, point-black range, and ability to conduct aimed fire at night were increased. Other special antitank weapons also appeared, including engineer mine-laying vehicles and mine layers.

On the basis of calculations, the tactics of the probable enemy, and the experience of exercises and local wars, it was considered that the defending motorized rifle battalion would be attacked by 50-60 tanks with a density of 10-12 vehicles per kilometer of front. Consequently, the density of the tanks attacking in the first echelon was reduced in comparison with the first postwar period. This was a result of the fact that, first, the capabilities of the means of destruction, and primarily of nuclear weapons, increased and, second, there was an increase in the width of the zone of attack of enemy units and large units; he had dispersed the combat formations of his troops in the interests of protection against weapons of mass destruction. In combat operations with the employment of conventional means of destruction alone, the enemy will create higher densities which may be two or three times greater than when nuclear weapons are employed. In both cases, the defending subunits must still combat armored personnel carriers (infantry combat vehicles) which can attack with a density of up to 30-60 units per kilometer of attack front.

In this period, the motorized rifle battalion is usually reinforced with tanks (up to a company), antitank artillery (up to a battery), and a PTURS subunit. Having about 20 antitank weapons<sup>12</sup> as well as hand-held antitank grenade launchers in each rifle squad the motorized rifle battalion, in coordination with the PTO weapons which are at the disposal of the senior commander, is capable of repelling the attack of tanks and other enemy armored vehicles.

Prior to the end of the 1950's, the antitank defense of the combined-arms subunits, units, and large units consisted of the same elements as in the first stage. Thus, for example, on troop exercises in 1961 in which the



rifle company of Captain V. I Fedorov participated the following were organized: company antitank strong points<sup>13</sup> which were combined into BPTU's, a regimental antitank area, and other PTO elements which were created in the first postwar period. However, subsequently, beginning in the 1960's, the structure of the antitank defense changed. Guns, tanks, PTURS's, and antitank grenade launchers were located in the motorized rifle battalion in company strong points; tank ambushes were organized; antitank obstacles were set up; reserves were established (Fig. 2).<sup>14</sup>

The redesignation of company antitank strong points as company strong points and the elimination of the term "battalion antitank center" were caused by the new principles in the organization of PTO and the change in its role and place in the tactical defense system. PTO ceased to be a type of combat support. It was transformed into the backbone of the defense. Combating tanks became the basic content of the combat operations of all combat arms in repelling the attacking enemy.

The main means for the effective destruction of tank formations are nuclear missile weapons which are capable of putting entire tank units and large units out of operation in a short time.<sup>15</sup> However, it is not always expedient to employ them, in particular when repelling the attacks of small tank groups, especially those which are moving or close to friendly troops.<sup>16</sup> Therefore, as formerly the engaging of tanks on the approaches to the defense is conducted by aviation and by artillery from indirect fire positions. Here, a special role is played by the massed fire of rocket artillery whose range of fire has increased three- or four-fold in comparison with the Great Patriotic War and by aviation. As the experience of local wars has shown, here in addition to conventional bombs and cannon it widely employs rockets and incendiaries. According to the calculations of foreign military observers, in October 1973 in the Middle East about 20 percent of all tanks destroyed were destroyed by aviation.<sup>17</sup>

The increase in the role of artillery and aviation in combating tanks facilitated the antitank defense by special antitank weapons to a considerable degree. If in the first postwar years the main role in the destruction of tanks was played by special weapons, their role was reduced with the adoption of nuclear weapons in the inventory. However, with the conduct of combat operations employing conventional weapons alone the special antitank weapons which are in the company strong points, reserves, and mobile obstacle-placing detachments remain the main PTO means and this was convincingly demonstrated by the experience of local wars.

In the Arab-Israeli War of 1973 in which more than 5,000 tanks participated on both sides, the Israeli troops lost more than 500 tanks already in the first week. Of them, 65-70 percent were knocked out by the fire of PTURS's and hand-held grenade launchers.<sup>18</sup> The war showed the great effectiveness of a fire system constructed on the actions of PTURS and tank subunits from ambush. Thus, one of the Israeli tank brigades fell into a "killing ground" and was destroyed literally in minutes by cross flanking fire of the Arab

antitank weapons. The Israelis detailed up to a tank battalion reinforced by a PTURS subunit to organize ambushes.<sup>19</sup>

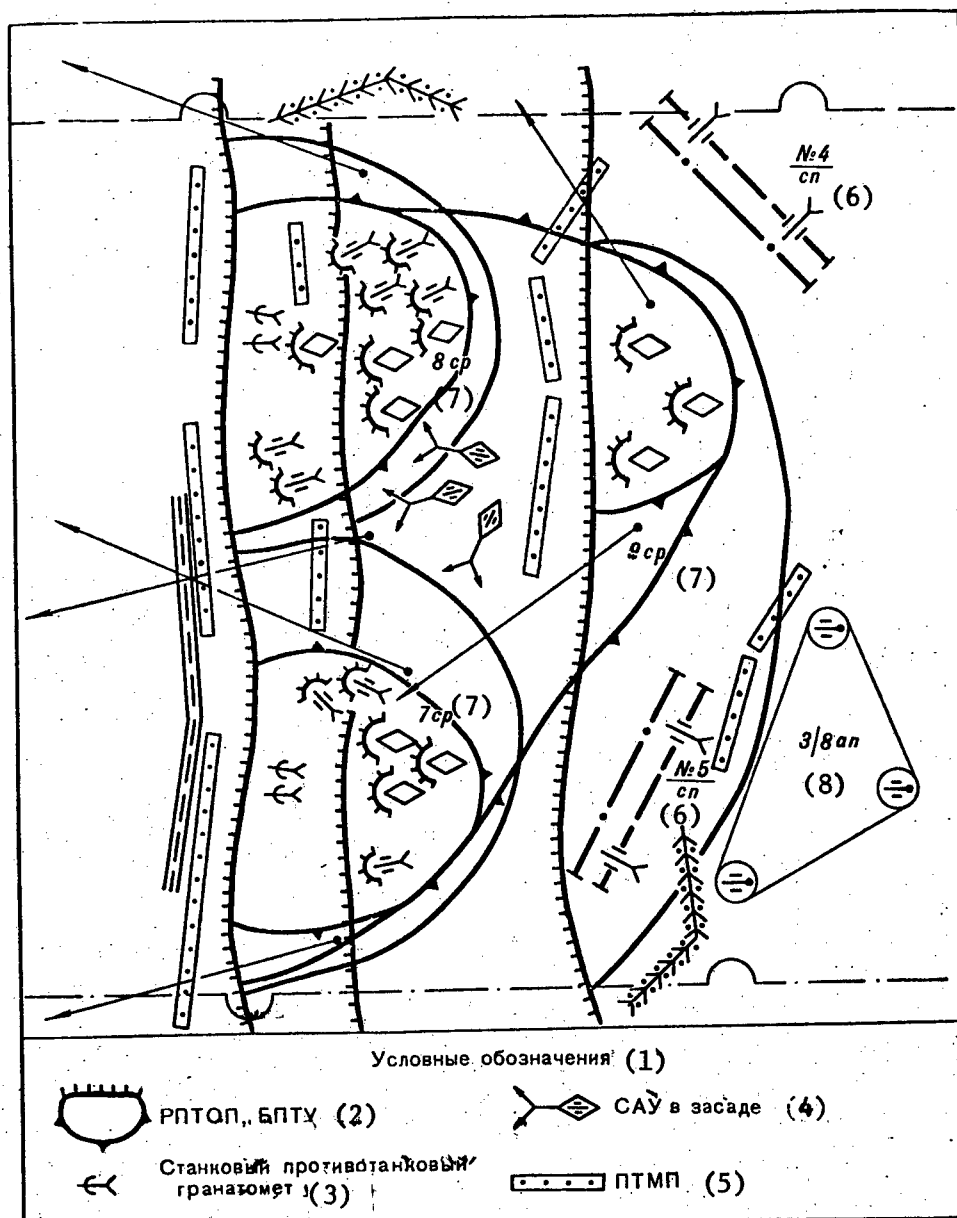


Fig. 2.

Key:

- |                                      |                           |
|--------------------------------------|---------------------------|
| 1. Legend                            | 5. Antitank minefield     |
| 2. RPTOP, BPTU                       | 6. Rifle regiment         |
| 3. Mounted antitank grenade launcher | 7. Rifle company          |
| 4. SAU in ambush                     | 8. 3/8 Artillery Regiment |

The basic changes in the PTO of a motorized rifle battalion in the second postwar period were connected with a considerable expansion of the defensive front (up to 5 kilometers) and the presence of gaps between company strong points (up to 1.5 kilometers). This organization, which was caused by protection against enemy nuclear weapons, increased the significance of the all-around defense of each company strong point and put forth the requirements for covering the gaps and maneuvering the antitank weapons in the course of battle. Tank ambushes and the antitank reserve which was in readiness to maneuver to prepared firing positions on a threatened sector became new elements of the battalion antitank defense. In organizing the fire system, a special place is occupied by the creation of "killing grounds"--the most expedient form for organizing the fire of the antitank weapons when conducting flanking and oblique fire.

An example of repelling a tank attack by creating a "killing ground" was the actions on troop exercises in 1972 by a motorized rifle battalion under the command of Lieutenant Colonel Kosarev.<sup>20</sup> Having determined the probable direction of attack of the "enemy's" main body, the battalion commander created a dummy company strong point in the center of the battalion defense area in which he placed a reinforced platoon. With the start of the "enemy" attack, on the signal of the battalion commander the platoon began a withdrawal under cover of artillery fire and smoke. Up to two battalions of "enemy" motorized infantry with tanks, enveloping the company strong points which offered resistance, broke into the battalion defense area and found themselves on a "killing ground." The battalion commander called for the barrage fire of the supporting artillery battalion and gave the subunits the signal to open previously organized concentrated fire on the "enemy" who had broken through. Finding himself under strong flanking and oblique fire, the "enemy" tried to remove the remnants of his subunits from the "killing ground;" however, only individual tanks and armored personnel carriers were able to get out.

The conduct of an antitank defense under conditions where nuclear weapons are used increased the role of the maneuver of antitank weapons. They became stronger and more mobile. Abroad, a special place in the composition of the reserve is beginning to be occupied by helicopter gunships equipped with PTURS's which, in the course of the Arab-Israeli War of 1973, inflicted serious losses by sudden strikes on the tanks which had broken through. The strength of the second echelons, the basis of which consists of tanks, also increased and the role of counterattacks when combating the tanks of the attacking enemy also grew.

Minefields play a large role in the antitank defense. Here, the density of the antitank mines emplaced in the ground ahead of time decreased in comparison with World War II while the number of mines emplaced in the course of battle increased. Using highly mobile and, as a rule, armored mine-laying vehicles the POZ's are capable of emplacing minefields quickly and suddenly, slowing movement and hampering the maneuver of the tanks. Means for the remote emplacement of antitank mines by rocket projectiles are appearing,<sup>21</sup> which increases the effectiveness of the minefields. Nuclear land mines are becoming the main means for combating tanks.<sup>22</sup>

Thus, in the second postwar stage of the development of the antitank defense its role increased sharply. The equipping of the troops with nuclear weapons made general-purpose weapons the basic ones in combating enemy tanks. In turn, the increased role of tanks as the main shock force of the ground troops caused the swift development of fundamentally new special antitank weapons which occupy the predominant position in PTO in operations with the employment of conventional weapons alone. The main thing in the development of PTO in this period was the considerable strengthening of the mobile elements of the antitank defense of combined-arms subunits, units, and large units at the expense of its position elements and the organic combination of missions for combating enemy tanks with the general missions of the defense. The antitank defense was transformed from a type of combat support to the basis of combined-arms defensive battle.

The basic directions of the changes in antitank weapons in the postwar years consisted of: an increase in the armor penetrability and range of destruction; an increase in the accuracy of firing, especially under conditions of limited visibility and at night; an increase in the maneuverability and mobility of antitank weapons; the saturation of subunits and units of all combat arms and special troops with them. A result of the postwar development of antitank weapons is that the armored protection of contemporary tanks cannot withstand them.

The general trends in the development of methods for antitank defense after the Great Patriotic War were that combating tanks was transformed to the basic content of troop combat operations; the significance of general-purpose weapons in destroying enemy tanks increased; the role of the maneuver of antitank weapons in the course of battle increased. The increase in antitank stability is the main trend in the development of the defense in the postwar years.

#### FOOTNOTES

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2. ARTILLERISKIY ZHURNAL, No 4, 1945, pp 13-14.
3. [Not used]
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- 7-11. [Not used]

12. G. I. Garbuz, "Protivotankovaya oborona motostrelkovogo batal'ona" [The Antitank Defense of the Motorized Rifle Battalion]. Voenizdat, 1969, p 39.
13. VOYENNNY VESTNIK, No 7, 1961, pp 23-26.
14. "Boevoy ustav Sukhoputnykh voysk" [Field Manual of the Ground Forces]. Moscow, 1964, p 129.
15. G. F. Biryukov, G. V. Mel'nikov, "Bor'ba s tankami" [Combating Tanks]. Voenizdat, 1967, p 249.
16. A. N. Latukhin, "Protivotankovoye vooruzheniye" [Antitank Armament], Voenizdat, 1974, p 249.
17. ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 7, 1974, p 25.
18. Ibid, No 12, 1975, pp 13-15.
19. Ibid, No 5, 1974, p 13.
20. VOYENNNY VESTNIK, No 7, 1972, pp 37-39.
21. A. N. Latukhin, "Protivotankovoye vooruzheniye," p 259.
22. Ibid, p 242.

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## TASKS OF MILITARY TRADE ENTERPRISES DISCUSSED

Moscow AGITATOR ARMII I FLOTA in Russian No 12, Jun 78  
signed to press 12 June 78 pp 16-17

[Article by Maj Gen Intend Serv V. Bondarenko, deputy chief  
of the Main Trade Directorate, USSR Ministry of Defense:  
"Important Tasks for Military Trade"]

[Text] Under contemporary conditions the link between high  
combat readiness of units [chast'] and ships, the level of  
military discipline, and organization with satisfaction of  
the material and personal needs of the troops has especially  
intensified.

Solving problems of material and personal support to the  
troops, as underscored by the USSR Minister of Defense  
Marshal of the Soviet Union D. F. Ustinov in his speech at  
the All-Army Conference on Improving the Life of the Troops  
one must always keep in mind the main thing--one must see  
the goal in the name of which we do everything. For us this  
goal is to support high combat readiness in its broadest  
sense. And, everything that facilitates the achievement of  
this goal must be used in its fullest measure and everything  
that hinders this accomplishment must be decisively eliminated.

Military trade workers do a great deal to further improve  
the trade and personal support to the troops of the army and  
the navy. This is greatly facilitated by the active participation  
of military trade workers in the All-Army Competitive Review  
for the best unit (ship) housekeeping and trade and domestic  
enterprise. Based on the results of the competitive review,  
2/3 of our enterprises were recognized as being good and  
excellent. The best of them by order of the USSR Minister  
of Defense were awarded diplomas and certificates.

A lot is being done in the troop units to develop and improve the network of public dining enterprises and improve the quality of their work. A special place in the support of the material and cultural needs of soldiers and sailors falls to the snack bar. In an overwhelming majority of garrisons good snack bars are in operation. In them are created all of the conditions for the organization of the cultural and leisure time of the troops. They always have a broad assortment of products, and of culinary and baked goods. Thus, military snack bars like the Rossiya (MVO) [Moscow Military District], Elektron (KVO) [Kiev Military District], and Zvezdochka (DVO) [Far East Military District] are model contemporary enterprises in service, creation of comfort for visitors, and interior decorating.

This is a jubilee year for military trade workers. Military trade celebrates its 60th anniversary on November 16. The USSR Minister of Defense and the Chief of the Main Political Directorate of the Soviet Army and Navy have assigned the task in honor of this noteworthy date of improving organizational work in all collectives. It is necessary to direct the efforts of military trade workers to the fulfillment and overfulfillment of state plans and socialist pledges made in the third year of the Tenth Five-Year Plan and for further improvement in the level and quality of the trade and personal support to Soviet soldiers, members of their families, and Soviet Army workers and employees.

In accordance with the requirements of the December (1977) CC CPSU Plenum, we have analyzed the results of the trade, commercial, and economic activities of military trade organs for 1977.

Organizational measures have been taken for the mobilization of collectives for early fulfillment of state tasks and increasing the quality and effectiveness of work. And the results were quick in coming. The sales and profits plan for the first quarter was overfulfilled by all trade administrations in the military districts and fleets.

Based on the results of socialist competition for the first quarter of this year, the Traveling Red Banner and the first prize from the USSR Ministry of Defense and the CC of the Trade Union of workers in state trade and consumer cooperatives was awarded to the collective in the Trade Directorate of the Order of Lenin Leningrad Military District, with second place going to the Trade Directorate of the Red Banner Central Asian Military District and third to the Trade Directorate of the Red Banner Siberian Military District.

In recent years much has been done in military trade organs to improve the procurement of vegetables, fruits, and potatoes, especially early and hot-house vegetables. The sale of these valuable vitamin-rich products grows annually. The geography of their consumption has also materially changed. The sale of hot-house cucumbers and tomatoes has risen sharply. For example, tons of vegetables are sent by aircraft from Azerbaydzhan weekly to the garrisons of the Red Banner Northern Fleet during the winter and the spring. During this six-month period, the procurement and sales of early vegetables in the military trade organs of the Baltic, Belorussian, Ural, and Volga military districts has increased by 1 1/2 to 2 times in comparison with the corresponding period last year.

Military trade workers are greeting their holiday with high indicators in work which reflect the growing level of trade and personal support to the troops of the army and navy. In addition, it should be noted that there are some shortcomings in the trade and personal support. A number of enterprises are not fulfilling their sales plan. Breakdowns in the trade of goods available in warehouses are permitted. The level of culture of the service is low in certain enterprises. All of this requires a strengthening and pin-pointing of the mass agitational and indoctrinational work and systematic monitoring in all sectors, in all links.

The large collective of organs in military trade with a sense of high responsibility set about accomplishment of their complex of honorable tasks and are doing everything required for a further improvement in the trade and personal service to the army and the navy, for early accomplishment of state plans and socialist pledges made.

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## PREDRAFT TRAINING ACTIVITIES IN THE MOSCOW AREA

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signed to press 12 Jun 78 pp 22-25

[Article by Col A. Roman'kov, chief of the political department,  
Moskovskaya Oblast military commissariat [voyenkomat]:  
"Train Youths for Military Service"]

[Excerpt] During the 16 years of their existence, military commissariats always successfully solved such problems as how to compute the population suitable for military service, its call-up, formation of troop units, training of the reserves in military affairs, and training youths for service in the army.

In the competition for a fitting greeting to the 60th jubilee and based upon the results of socialist competition between military commissariats for the best training of youths for military service and the call-up into the USSR Armed Forces in 1977, the Moskovskaya Oblast Military Commissariat took first place and was awarded the Traveling Red Banner of the USSR Ministry of Defense, the USSR Minister of Defense's certificate, and a cash award.

A good training base has been created in Moskovskaya Oblast and a precise system of initial military training and military patriotic indoctrination of draft eligible and pre-draft youths has been put together. The Moskovskaya Oblast Military Commissariat has achieved high effectiveness in its activities thanks to close mutual cooperation between the military commissariats with local party and soviet organs, Komsomol organizations, and DOSAAF collectives.

Questions of improving work with draft eligible and pre-draft youths are periodically examined at the meetings of

the buro of the MK CPSU [Moscow oblast committee of the CPSU] and by the ispolkom of the oblast soviet. For example, at a meeting of the aktiv of the oblast party organization, they discussed the question "On Measures for the Further Improvement of Military-Patriotic Indoctrination of the Population in the Light of the Requirements of the 25th CPSU Congress."

Special commissions for training youths for military service have been set up by city and rayon CPSU committees. They consist of the representatives of all organizations involved in work with draft-eligible and pre-draft youths.

The scientific practical conference entitled "Urgent Questions of the Military-Patriotic Indoctrination of Youths" conducted by the MK Komsomol, oblvoyenkomat and oblast DOSAAF committees held at the Central Museum of the USSR Armed Forces in February of this year facilitated improving work with youths.

Local Councils of Peoples' Deputies also placed constant attention on the training and indoctrination of future soldiers. In 1977-1978 in all rayons in the oblast, sessions have been held of the ispolkoms of the city and rayon soviets with the agenda being "On Progress in Administering the 'Law on Universal Military Service' in the Rayon."

The Mytishchi, Podol'sk city, Balashika, Krasnogorsk, Khimki, and other military commissariats are having the best results in recent years in preparing youths for military service. Socialist competition has been organized not only among the military commissariats of the oblast but also among the secondary educational institutions, enterprises, and local soviets. The results in accomplishment of socialist obligations are periodically analyzed and discussed within the collectives. For the best training of youths for military service, the victors in competition are awarded traveling banners, cups, and pennants. They are awarded both in the oblast as well as in the rayons.

The local press, radio, and television are widely used in illuminating progress in competition. Material concerning the training of youths for service and the work of military instructors in schools are published under special rubrics in rayon newspapers and letters from unit [chast'] commanders concerning the service of our young landmen are publicized.

The military commissariats call upon a broad circle of reserve officers and generals, the local party and Komsomol aktiv, and representatives from military units in the organization of explanatory and reference work and in the conduct of various mass agitation measures during the period of registering youths at registration sectors and during the call-up. At the oblast assembly point in 1977, for example, 11 CPSU gorkom and raykom secretaries and 10 chairmen from local soviet ispolkoms spoke. Among the numerous agitators were 30 Heroes of the Soviet Union, 12 Heroes of Socialist Labor, and 21 full Cavaliers of the Order of Glory.

It has become traditional for the pre-draft and draft-age youths to make excursions to military units and to visit military schools during open-door days. Here the youths who are preparing themselves for service familiarize themselves with the life and routine of the soldiers and students and more deeply feel the responsibility for the defense of the socialist fatherland. Joint trips between servicemen and civilian youths to the sites of former battles, joint meetings, and so on have become widespread in the Moscow area.

Approximately 1,000 monuments, obelisks, and memorial plaques have been set up on the heroic land of the Moscow area and there are hundreds of fraternal cemeteries. On Victory Day--May 9--millions of citizens from Moscow and the Moscow area visit these places of military glory. Students and the workers from enterprises, kolkhozes, and sovkhoses esteem the memory of these heroes. These and other trips are taken under the banner "Along the paths of our fathers' glory."

At a recent meeting of the MK CPSU buro they passed a decree "On the Initiative of the Oblast Komsomol Organization in Development of the Movement 'Equating to the Heroes of the War. To the Veterans--Komsomol Concern'." The patriotic indoctrination of the future troops meets the growing demands of the party for the training of ideologically tempered and physically strengthened reinforcements for the Armed Forces.

The faculties of military and political knowledge, universities and clubs of the future soldiers, and agitational points are used with great popularity by the youths of the Moscow area.

Museums and rooms and corners of combat glory have been created and military offices have been opened up with the support of military commissariat workers at many enterprises and in the oblast's schools, sovkhoses, and kolkhozes. Meetings are held here with veterans of the Great Patriotic War, as are thematic mornings and conversations with pre-draft youth. Taking active part in them are Maj Gen (Ret)

V. Petrov, Rear Adm (Ret) O. Machinskiy, and Hero of the Soviet Union Col (Res) A. Turikov.

Military commissariats, educational institutions, and DOSAAF schools in their military-patriotic indoctrination are placing ever greater attention on military sponsorship work and expanding the ties with military units.

Carrying out the decisions of the 25th CPSU Congress, the military commissariats of Moskovskaya Oblast along with comprehensive support from local party and soviet organs are unswervingly improving the quality of training of youths for service in the USSR Armed Forces. Based on the results of last year from the oblast, 84 percent of the youths sent to troop units had a higher and secondary education and approximately 80 percent of them were Komsomol members. One hundred percent wore the GTO [Ready for Labor and Defense] badge. The personnel of the military commissariats in Moskovskaya Oblast guided by the behests contained in the speech by comrade L. I. Brezhnev at the 18th Komsomol Congress and in his works are doing everything to improve as they have in the past the quality of training of youths for military service and to make their contribution to the cause of defending the socialist fatherland.

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